App. No. 10/529,536
Office Action Dated November 20, 2007

REMARKS

Favorable reconsideration is respectfully requested in view of the above amendments and following remarks. Claims 1, 2, 4, 8, 9, 11 and 12 have been amended. Claim 1 has been amended to require a two-component developer to include a carrier and a toner, and is supported by for example Working Example 1. The limitation in claim 1 concerning the toner is supported for example by page 15, line 18. Claims 2, 4, 8-9 and 11-12 have been amended editorially. No new matter has been added. Claims 1-2, 4, 8, 9, 11 and 12 are pending.

Specification

The specification is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. Applicants submit herewith a brochure indicating that LEL 400P is a polyethylene wax (CBC(Europe) Ltd., Chemical Division). With this submission, Applicants respectfully submit that no new matter was added in the amendment filed 24 February 2006.

Withdrawal of the objection is respectfully requested.

Claim Objections

Claim 1 is objected to because of informalities. Claim 1 has been amended, taking the issues noted in the objection into account.

Withdrawal of the objection is respectfully requested.

Claim rejections - 35 U.S.C. § 103

Claims 1, 2, 4, 8, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. 2003/0091923 (Kobayashi et al.). Applicants respectfully traverse the rejection.

Claim 1 requires a two-component developer to include a carrier for electrophotography in which a surface of at least a core material is coated with a resin and a toner. Claim 1 requires a coating resin to include a fluorine modified silicone resin and an aminosilane coupling agent. Claim 1 requires the aminosilane coupling agent to be included in a range of 5 to 40 weight parts with respect to 100 weight parts of the coating resin. Claim 1 also requires the fluorine modified silicone resin to be a crosslinked fluorine modified silicone resin. The cross-linked fluorine modified silicone resin required by claim 1 is obtained by reacting an organosilicon compound containing a perfluoro alkyl group with polyorganosiloxane within a range of 3 to 20 weight parts with respect to 100 weight parts of the polyorganosiloxane. Claim 1 further requires the

toner to contain a polyester resin and to be charged negatively. When the crosslinked fluorine modified silicone resin in amounts as required by claim 1 is included along with the aminosilane coupling agent, a negative charge is imparted to the toner containing a polyester resin while a sharp distribution of the charge amounts of the positively charged fluorine modified silicone resin layer is secured (see page 11, lines 21-26 of the specification). As a result, the charge amount can increase instantly with respect to the toner supplied at the time of printing (Id.). Moreover, the carrier according to claim 1 exhibits excellent transfer efficiency based on superior toner stripping properties with high durability (see page 11, lines 28-30 of the specification).

The advantageous effects of the two-component developer according to claim 1 are demonstrated in the Experimental data of the specification. Briefly, polyorganosiloxane and 8 weight parts of $C_8F_{17}CH_2CH_2Si(OCH_3)_3$ with respect to 100 weight parts of the polyorganosiloxane were allowed to react so as to obtain a crosslinked fluorine modified silicone resin (see page 24 of the specification). Carrier 2 was obtained by dissolving crosslinked fluorine modified silicone resin with 9 weight parts of γ-aminopropyltriethoxysilane with respect to 100 weight parts of the coating resin (see page 25 of the specification). As a comparative example, carrier 7 was obtained by dissolving a straight silicone resin (SR-2411) with 9 weight parts of γ-aminopropyltriethoxysilane with respect to 100 weight parts of the coating resin (Id). As yet another comparative example, carrier 8 was obtained in the same way as carrier 7 except that conductive carbon (produced by Ketjenblack International Company: EC) was dispersed at a ratio of 5% with respect to the solid compound of the resin by using a pearl mill (Id). Table 4 shows the results obtained when using the above carriers in a durability test (see page 30 of the specification). As shown in the table, carrier 2 exhibited a transfer efficiency of over 90%. Carrier 2 also showed an instant increase of the charge amount and exhibited stable characteristics in which the charge amount tended not to decrease at high temperature or high humidity, and in which the charge amount did not tend to change at low temperature or low humidity. On the other hand, when carrier 7 or carrier 8 was used, transfer efficiency was decreased to below approximately 60%. Moreover, fusion between the toner and the carrier tended to occur, and the carrier resistance changed significantly. The charge amount also tended

to decrease, and fog tended to increase. In addition, the charge amount increased at low temperature or low humidity, so that the image density was reduced.

The rejection contends that it would have been obvious to prepare a carrier having the amount of the aminosilane specified in Example 3 and a fluorine-modified silicone resin in the carrier resin coat layer because each of these components is disclosed as effective in the resin coat layer and the artisan would combine specifically disclosed components to obtain the reduced environmental dependence on charge discussed in paragraph [0018]. However, the reference does not specifically disclose using a crosslinked fluorine modified silicone resin obtained by reacting an organic silicon compound containing a perfluoro alkyl group with polyorganosiloxane within a range of 3 to 20 weight parts with respect to 100 weight parts of the polyorganosiloxane as required by claim 1. Moreover, nothing in the reference teaches or suggests that by limiting the amounts of the aminosilane coupling agent as well as the organic silicon compound containing polyorganosiloxane and a perfluoro alkyl group as required by claim 1, a negative charge to the toner containing a polyester resin can be imparted while securing a sharp distribution of the charge amounts of the positively charged fluorine modified silicone resin layer, thereby increasing instantly the charge amount with respect to the toner supplied at the time of printing. In fact, Kobayashi notes that the coupling agent can be added in amounts of up to 60% by weight based on the solids content of the coating resin.

The rejection further contends that there is no evidence of record to show an unexpected result for the claimed carrier as compared to Kobayashi's carriers. However, as clearly shown in the experimental findings in the specification, there was an unexpected increase in transfer efficiency by approximately 30% when the fluorine-modified silicone resin as required by claim 1 was used rather than the straight silicone resin of Kobayashi's Example 3, along with 5 to 40 parts of the aminosilane coupling agent with respect to 100 weight parts of the coating resin. Nothing in the reference suggests that reacting different amounts of the organic silicon compound containing a perfluoro alkyl group and the polyorganosiloxane, let alone the specific amounts of the components to be used as required by claim 1, would lead to such a significant increase in transfer efficiency. Therefore, claim 1 and the dependent claims therefrom are patentable over Kobayashi.

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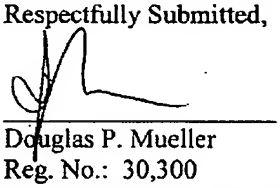
Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. 2003/0091923 (Kobayashi et al.) as applied to claims 1, 2, 4, 8, 9 and 11 above, and further in view of Chemical Abstracts Registry for KBE 903 (RN # 919-30-2). Applicants respectfully traverse the rejection.

Kobayashi has been distinguished above. Chemical Abstracts Registry for KBE 903 does not remedy the deficiencies of Kobayashi. Therefore, claim 12 is patentable over the references for at least the same reasons mentioned above. Applicants do not concede the correctness of the rejection.

In view of the above, favorable reconsideration in the form of a notice of allowance is requested. Any questions or concerns regarding this communication can be directed to the attorney-of-record, Douglas P. Mueller, Reg. No. 30,300, at (612) 455.3804.

Respectfully Submitted,

Dated: Feb. 20, 2008



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Encl: CBC(Europe) Ltd., Chemical Division

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RIF. CBC IT
DATA 23/08/2004
COD. No S-VI/1/I

SANWAX - VISCOL

DATA SHEET

SANWAX products are low-molecular weight polyethylene.

VISCOL products are low molecular weight polypropylene.

They are produced by a Sanyo Chemical original manufacturing process.

Compared with polyethylene and polypropylene, these products have lower molecular weights, however, they have softening points equivalents to those of polyethylene and polypropylene.

Compared with paraffin wax , these products have higher molecular weight, however, they have viscosity equivalent to those of paraffin wax.

Having such a peculiar combination of properties. SANWAX products and VIS>COL products are widely used in a variety of application including pigment and filler dispersant, lubrificant for PVC, releasing agent for paint, softening point enhancer for EVA & paraffin wax, sewabilitry improver, and gelling agent for cosmetics.

We offer a wide range of SANWAX products and VISCOL products as follow:

Polyethylene				Polypropylene
Low density		High density		
Non-oxydized type	Oxydized type	Non-oxydized type	Oxydized type	
SANWAX	SANWAX	SANWAX	SANWAX	VISCOL
131-P 151-P 161-P 165-P 171-P	E-250P E-310 E-330	LEL-250 LEL-800	LEL-400P(EX)	330P 440P 550P 660P

Important: before to handle these products refer to the Material Safety Data Sheet (MSDS) for recommended protective equipment and detailed precautionary and hazards information.

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SANWAX - VISCOL

DATA SHEET

TYPICAL PROPERTIES

Table 1 and table 2 show the properties of SANWAX products and VISCOL products.
The listed values are typical ones.

Table 1: typical properties of SANWAX products and VISCOL products

Products	Appearance (20±5°C)	Colour (Molten APHA)	Viscosity mPa·s (140°C)	Softening Point 4) °C
SANWAX 171P	White powder	30	180	107
SANWAX 151P		30	290	107
SANWAX 131P		30	1.000	108
SANWAX 161P		30	4.300	111
SANWAX 165P		30	4.300	107
SANWAX E-310	Pale yellow pellet	100	270	103
SANWAX E-300		100	850	104
SANWAX E-250P	Pale yellow powder	7 1)	320	103
SANWAX LEL-250	White pellet	50	625	124
SANWAX LEL-800		100	22.000	133
SANWAX LEL-400(EX)	White powder	50	650	128
VISCOL 660P	White Powder	1 1)	70 3)	145
VISCOL 550P		200	200 3)	152
VISCOL 440P		200	2000 2)	153
VISCOL 330P		200	4000 2)	153

1) Molten, gadner 2) Brookfield viscometer at 140°C 3) Measured a t 160°C 4) ASTM E28-58T

Table 2 Typical properties of SANWAX products and VISCOL products

Products	Penetration Hardness (100g 5s 25°C) 5)	Acid Value	Density 6) (20°C)	Average Molecular Weight 7)
SANWAX 171P	4,5	Nil	0,92	1.500
SANWAX 151P	4	Nil	0,92	2.000
SANWAX 131P	3,5	Nil	0,92	3.500
SANWAX 161P	2	Nil	0,92	5.000
SANWAX 165P	2	Nil	0,91	5.000
SANWAX E-310	5	15	0,93	2.000
SANWAX E-330	4	17	0,94	2.000
SANWAX E-250P	5	20	0,95	2.000 8)
SANWAX LEL-250	< 1	Nil	0,95	3.000
SANWAX LEL-800	< 1	Nil	0,96	6.000
SANWAX LEL-400(EX)	1	1	0,96	4.000
VISCOL 660P	1,5	Nil	0,89	3.000
VISCOL 550P	< 1	Nil	0,89	4.000
VISCOL 440P	< 1	Nil	0,89	9.000 8)
VISCOL 330P	< 1	Nil	0,89	15.000 8)

5) ASTM 1321-61T 6) ASTM D 792 T 7)measured with vapour-pressure osmotic-pressured method
8) Number average molecular weight measured with gel permeation chromatography

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FEATURES

Compared with polyethylene polypropylene, and waxes such as paraffin wax, carnauba wax and montan wax, SANWAX products and VISCOL products have the following features.

1. VISCOSITY

Compared with paraffin was, SANWAX products and VISCOL products have higher molecular weight, however they have viscosity equivalent to that of paraffin wax (figure 1)

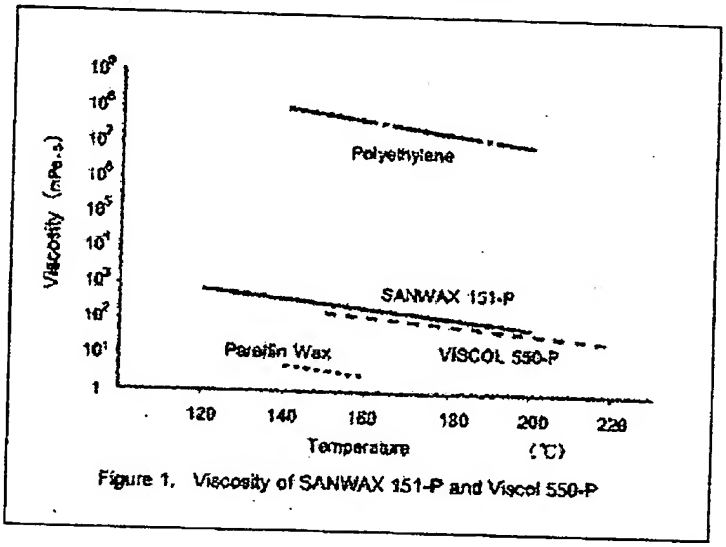

Figure 1. Viscosity of SANWAX 151-P and Viscol 550-P

2. SOFTENING POINT

Compared with polyethylene and polypropylene, SANWAX products and VISCOL products have molecular weight, however, they have softening points equivalent to those of polyethylene and polypropylene.

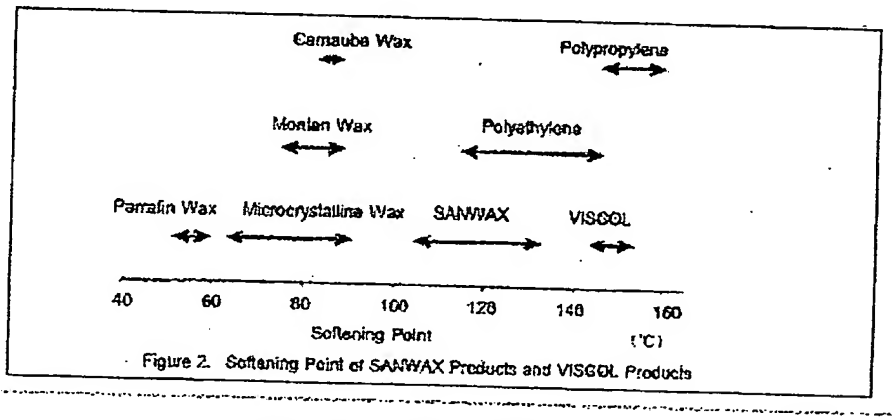

Figure 2. Softening Point of SANWAX Products and VISCOL Products

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3. PENETRATION HARDNESS

Compared with polyethylene and polypropylene, SANWAX products and VISCOL products have lower molecular weight, however, they have penetration hardness equivalent to that of polyethylene and polypropylene.

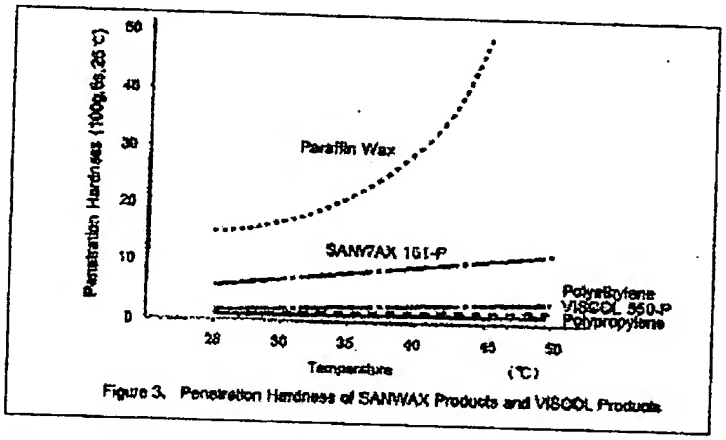

Figure 3. Penetration Hardness of SANWAX Products and VISCOL Products

4. COMPATIBILITY WITH RESINS

Generally, SANWAX products and VISCOL products are compatible with polyolefins and not compatible with other resins.
TABLE 3 shows the compatibility of SANWAX products and VISCOL products with resins at 160°C

Products	Compatible	Compatible to a less degree	Incompatible
SANWAX (Non oxydized type)	Polyethylene Polypropylene	- Polyamide - Polybutyleneterephatalate - Polymethylmetacrylate	- Polyvinylchloride - Polystyrene - Polycarbonate - Ethylene-vinylacetate copolymer
SANWAX (oxydized type)		- Polyamide - Polybutyleneterephatalate - Polymethylmetacrylate - Ethylene-vinylacetate copolymer	- Polyvinylchloride - Polystyrene - Polycarbonate
VISCOL		- Polyamide - Polybutyleneterephatalate - Polymethylmetacrylate	- Polyvinylchloride - Polystyrene - Polycarbonate - Ethylene-vinylacetate copolymer

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SANWAX - VISCOL DATA SHEET

APPLICATION

Table 4 and table 5 show the relationship between various applications and the suitable SANWAX products and VISCOL products.

Table 4 Application Of SANWAX products and VISCOL products (1)

Basic Properties	Comparable with Polyolefin low viscosity			Incompatible with resins other than polyolefin High Softening Point									
Applications / Products	Pigment Dispersant for Polyolefin	Filler Dispersant for Polyolefin	Flowability improver for Polyolefin	Gelling Agent for oil	Lubricant for PVC	Releasing Agent & Flowability improver for rubber & resins other than Polyolefin	Releasing Agent for Polyurethane Molding	Abrasion Resistance improver Paint &Ink	Antisagging Agent for Paint	Delustering Agent for Paint	Gelling Agent for Cosmetics	Fixing Agent for Agrochemicals	Releasing Agent for Concrete Molding
SANWAX E-SP	B	B	B	B	A	A	A	B		B	A		
SANWAX E-HP	A	A	A	B	A	A	A	B		A	A		
SANWAX E-LP	A	A	A	A	B	B	B	A		B	B		
SANWAX E-HLP	A	A	A	A	B	B	B	A		B	B		
SANWAX E-105 P	A	A	A	A	B	B	B	B		B	B		
SANWAX E-210	B	B	B	B	B	B	B	B	A	B		B	B
SANWAX E-310	B	B	B	B	B	B	B	B	A	B		B	B
SANWAX E-250P	B	B	B	B	B	B	B	B	A	B		B	B
SANWAX E-L-250	A	B	B	B	B	B	B	A		A			
SANWAX LEL-60P	A	B	B	B	B	B	B	A		A			
SANWAX LEL-400P EXT	A	A	B	B	B	B	B	A		A			
VISCOL 660P	B	B	B	B	A	A	B	B		B			
VISCOL 550P	A	A	A	B	A	A	B	B		B			
VISCOL 440P	B	B	B	B	B	B	B	B		B			
VISCOL 330P	B	B	B	B	B	B	B	B		B			

A: Excellent suitability B: Good suitability (Blank): Unsuitable

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Table 5 Application Of SANWAX products and VISCOL products (2)

Basic Properties	Low Viscosity, High Hardness			Low Viscosity, High Softening Point				High Softening Point, High Hardness				Low Viscosity
Applications / Products	Releasing Agent for Heat Fixing Toner	Releasing Agent for Pressure Fixing Toner	Abrasion Resistance for Preeassure Fixing Toner	Ingredient for Shoepolish & Lipstick	Softening Point Enhacer for EVA	Softening Point Enhacer for Paraffin Wax	Surface Treatment Agent for Paper	Polishing Agent for Cosmetics	Ingredient for Floor Polishing Agent	Sewability Improver	Softening Point Enhancer for Asphalt	Binder for Ceramics
SANWAX E-14 P			B	A	B	B	B	B				
SANWAX E-18 P			B	A	B	B	B	B			B	B
SANWAX E-14 H			B	B	B	A	A	B			B	B
SANWAX E-21 P				B	B	A	A	B				B
SANWAX E-165 P				B	B	B	B	A				B
SANWAX E-310			A	A	B	B	B		A	A		B
SANWAX E-315			A	A	B	B	B		A	A		B
SANWAX E-350 P			A	A	B	B	B					B
SANWAX LEL-250		A		B	B	A	A					B
SANWAX LEL-400		A		B	B	A	A				A	B
SANWAX LEL-400 HEX		A		B	B	A	A				A	B
VISCOL 660 P	A				B	B	B				A	B
VISCOL 550 P	A				B	B	B					B
VISCOL 440 P	A				B	B	B					B
VISCOL 330 P	B				B	B	B					B

A: Excellent suitability B: Good suitability (Blank): Unsuitable

Manufactured by	三洋化成工業株式会社
	Sanyo Chemical Industries, Ltd.

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